IMPERIAL BUREAU
15 AUG. 1930
OF MYCOLOGY

BERMUDA

REPORT

OF THE

DEPARTMENT

OF

AGRICULTURE

FOR THE YEAR

1929

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Board of Agriculture, 1929.

Hon. Lt.-Col. T. M. DILL, O.B.E., M.C.P., Devonshire, Chairman.
Hon. S. S. SPURLING, C.M.G., O.B.E., M.C.P., St. Georges, Acting Chairman.
Mr. B. C. C. OUTERBRIDGE, M.C.P., Smiths, Vice-Chairman.
Mr. F. C. MISICK, M.C.P., Sandys.
Mr. W. A. H. BARNES, Southampton.
Mr. F. W. STEPHENS, Paget.
Mr. J. DE MOURA, Southampton.
Mr. A. W. WEST, Hamilton.
Wor. T. H. H. OUTERBRIDGE, J.P., M.C.P., Hamilton.
Mr. JOHN SIMONS, Paget.

Note. The Chairman, Hon. Lt.-Col. T. M. Dill, was incapacitated by a serious accident from presiding at the meetings of the Board, and on 12th March Hon. S. S. Spurling was appointed Acting Chairman, which appointment he held throughout the remainder of the year.

Department of Agriculture, 1929.

Director of Agriculture, E. A. MCCALLAN.
Plant Pathologist, H. S. CUNNINGHAM, Ph.D., M.S.A., B.S.A.
First Agricultural Assistant, W. R. EVANS.
Inspector of Produce, E. L. ADAMS.
Horticulturist, J. C. NAUEN.
Clerk, HILDA C. LINES.

Part-Time Officers.

Government Veterinary Officer, R. L. TUCKER, D.V.S.
Assistant Inspector of Produce, T. ARTHUR HOLLIS.
Sub-Inspectors of Produce, C.V.S. EARLY, E. C. CASE, A. W. DOE, J. W. M. GIBBONS.

Agricultural Station,

Bermuda,

11th June, 1930.

Sir,

I am directed by the Board of Agriculture to lay before His Excellency the Governor, for the information of the Legislature, the accompanying report of the Department of Agriculture for the year ended 31st December, 1929.

I have the honour to be,

Sir,

Your obedient servant,

HILDA C. LINES,

Clerk, Board of Agriculture.

The Honourable,

The Colonial Secretary,

Hamilton.

Report of The Director of Agriculture, 1929.

The Chairman,

The Board of Agriculture,

I have the honour to submit reports of the activities of the Department during the year 1929, in accordance with the provisions of Section 4 (7) of The Agriculture Act, 1930.

AGRICULTURAL STATION.

An account of the principal work performed at the Station follows.

Potato Tests.—The testing of strains of Triumphs, Garnet Chilis and Irish Cobblers, and Dr. Fernow's treatments of dormant tubers constituted the chief potato work for the year. The behaviour of strains under test was made known to the importers of seed potatoes. Triumph seed grown in Long Island, New York, from stock obtained from the Nebraska Certified Seed Potato Growers Co-operative again gave excellent results, as did the same strain when imported direct from Nebraska for March planting. Nova Scotia strains of this variety do not appear to be altogether reliable.

Garnets from Nova Scotia contained low percentages of leaf-roll. An importation of this variety was made from Prince Edward Island, and in freedom from virus diseases and in yield was slightly superior to the average of the Nova Scotia strains.

The Irish Cobbler is a popular variety for planting late for domestic use, but does not stand up well under dry weather which is common at the season of the year when this variety is in the field. Information obtained in Nova Scotia suggested that the Early Ohio might prove a useful variety to replace the Cobbler, and a small sample was obtained from the Experimental Farm at Truro for planting in 1930.

Dr. Denny's Treatments.—Since 1926 tests have been made each Autumn of Dr. F. E. Denny's chemical treatments of dormant seed with the object of shortening the rest period. The subject is one of peculiar interest to Bermuda. Though the results have not been uniformly satisfactory, it appears highly probable that Dr. Denny, who is supervising the experiments here, will eventually develop a treatment that will give uniformly satisfactory results.

Vegetables. Viability tests of vegetable seeds imported by licensed seed vendors gave the following results with 162 samples tested:

Very good to good	48.8 per cent
Fair	30.0 " "
Poor	11.2 " "
Failed	10.0 " "

Tests of varieties of vegetables are somewhat disappointing because of the varied results obtained from year to year. Seed purchased commercially is not consistent in its behaviour, as a rule.

The following shipping varieties are recommended:

Beet —Early Egyptian.

Cabbage—Early Jersey Wakefield, All Head Early and Succession. (Named in order of earliness.)

Carrot —Danvers Half Long and some strains of Chantenay. Dreer's Early Forcing is a variety likely to prove highly suitable.

Celery —Clause's Golden Self Blanching.
Other varieties appear to be excellent, but this well tried strain is very consistent.

Cucumber—White Spine varieties.

Parsley —Any good dark green, double curled variety.

Tomato —Bonny Best and John Baer.

FERTILISER TESTS.—Tests of time of application of castor pomace on potatoes were made. The crop was fertilised when planted or when cultivated, and the tests, and former ones, indicate that there is little difference in the merits of the two methods. Farmers are recommended to apply castor pomace at the time most convenient.

Applications of castor pomace on potatoes at the rate of 7½ pounds, 10 pounds and 15 pounds per rod were in favour of the lowest rate. This and other seasons' tests indicate that light dressings of fertiliser are all that are required on potato land in good heart. Much loss may result from too liberal applications of fertilisers.

Comparative tests of castor pomace and H.O.P., an English complete fertiliser, gave slightly better results from the latter, but insufficient to compensate for the difference in price. The lightest application of H.O.P., as with castor pomace, gave the highest yield.

Onions.—The selection work, begun in 1925, was continued. Bulbs are selected each year from beds sewn to seed grown by Messrs. Aggeler and Musser Seed Company, Los Angeles, California, from bulbs selected in Bermuda the previous season. It is evident that improvement in the strain is being secured. Farmers to whom small samples of the seed were given reported that the seed gave better results than did commercial strains.

Leguminous Green Manuring.—Nearly all experimental plots were sown to soy or soja beans for green manuring. The practice is strongly recommended.

Horticultural Report.—The report of the Horticulturist will be found on another page.

Live Stock.—The Station live stock consisted within the year of the following animals:

GUERNSEY CATTLE.

Montrose Hector (143,022); sire, Albamont Argonaut; dam, Dora of Atwood's Dairy; born 24th January, 1927; breeder, Department of Agriculture.

Montrose Hercules (173,171); sire, Montrose Hector; dam, Albamont Juliet; born 9th September, 1929; breeder, Department of Agriculture.

Albamont Juliet (85,736); sire, Deanie's May King; dam, Juliana of Gerar; born 20th April, 1918; breeder, J. C. Haartz, Compton, N. H., U.S.A.

Juliana of Montrose (203,737); sire, Montrose Sovereign; dam, Albamont Juliet; born 1st November, 1925; breeder, Department of Agriculture.

Julia of Montrose; sire, Uncle Sam of Somerville; dam, Juliana of Montrose; born 6th January, 1928; breeder, Department of Agriculture.

Joan of Montrose (281,658); sire, Montrose Hector; dam, Juliana of Montrose; born 13th April, 1929; breeder, Department of Agriculture.

Two calves were born during the year, Montrose Hercules and Joan of Montrose. Particulars of both are given above.

TOGGENBURG GOATS.

La Suise Jupiter (33,190), male; Sire, Jenk-I Rangy Chief; dam, Nona Alden; born 8th April, 1927; breeders, J. E. and M. B. Ettien, Wareagle, Arkansas, U. S. A.

Nancy II; sire, Arrowhead; dam, Nancy; born 25th March, 1928; breeder, Department of Agriculture.

Disposal of Produce.—In Appendix B will be found particulars regarding produce given to other institutions or sold.

Rainfall.—The rainfall recorded at the Station will be found in Appendix C.

Repairs and Extensions of Buildings, etc.—The plant pathological greenhouse was completed early in the year. A slat-house 25 feet by 61 feet was built, and new arrangement of benches made in the fern house. The old rough stone shed near the cattle stable was removed and a wooden calf-pen (10 feet by 21 feet) built in its place, the cattle-stable was renovated, a concrete floor was put in one of the bull-pens, and Exhibition pig-pens (12) were built. Widening the Exhibition ring was contemplated, but was postponed because the Works Department could not furnish the required machinery.

There exists urgent need of a cattle-man's quarters, additional tankage near the stables, increased office room, and renovation of most of the Station buildings. The Station drives need resurfacing. The need for additional Exhibition housing is mentioned under "Annual Agricultural Exhibition".

Prison Labour.—A labour gang of four men was employed for a period of 690 man-days on the following works: Removing out-cropping rock in Rosebank Field and North-West Pasture, enlarging drainage pits off Berryhill Road, turfing and grading, preparing sites of slat-house and calf-pen, digging trenches for new hedges, lime-washing, and Exhibition preparations. The total cost to this Department (exclusive of breakage of tools) amounted to £13. 0. 0.

Office Work.—The routine work of the office was satisfactorily performed, but there remained no time in which to reduce work which has been accumulating for many years. Chief among this accumulated work is the recording and filing of field work and the indexing of the library. Unless extra assistance can be secured, it appears that this work will never be accomplished.

During the year under report 1,635 letters were received and 2,023 dispatched. Copy was prepared monthly for the Agricultural Bulletin. Copy was prepared for the local press. Statistical information for Blue Book, Imperial Institut d'Agriculture, etc. was prepared. Seed lists were mimeographed.

The Director's visits to Canada, the West Indies and the United States of America caused additional clerical work in the collection of information to be taken and in the preparation of reports on his return.

Publications Received and Issued.—Grateful acknowledgment is here made of the many valuable publications received from many agricultural and other scientific institutions.

The chief publication of the year, apart from the regular publications, were the Horticulturist's seed exchange lists which mark another progressive step. Six hundred copies of the monthly Agricultural Bulletin, 500 copies of the 1928 Report and 700 copies of the Exhibition Catalogue were published. Several thousand copies of a circular dealing with vegetables grown for export were posted to Canada.

Visitors.—Visitors to the Station included His Excellency the Governor, Sir Louis Jean Bols, and Lady Bols; Sir Esme Howard, British Ambassador, Washington, Hon. H. A. Ballou, Commissioner of Agriculture for the West Indies; Hon. Sidney Dash, Director of Agriculture for British Guiana; Hon. H. H. Hutchings, Administrator of Montserrat; Mr. J. W. Frazer, Canadian Trade Commissioner, Jamaica; Dr. Albert Hartzell, Entomologist, and Dr. S. E. A. McCallan, Plant Pathologist, Boyce Thompson Institute for Plant Research; Professor H. J. Quayle, Entomologist, California University; Mr. Frederick Newbold, Secretary, New York Horticultural Society; Mr. A. H. Allen, Assistant General Manager, Canadian National Steamships; Mr. A. M. Belding, Editor, Telegraph-Journal and Evening Times-Globe, Saint John, N. B.; Miss Mary Mossley, Editor, Nassau Guardian, Bahamas; Mr. Montague Free, Horticulturist, Brooklyn Botanic Garden; Mr. S. S. Savage, Secretary, Western Canada Fruit and Vegetable Jobbers Association; and Mr. Jared Van Wagenen, Jr., Lawyersville, New York.

AGRICULTURE IN 1929.

The year under report was one of agricultural depression and of transition of exports from the New York market to Canadian markets. The value of exports to the first-named market was 78 per cent and to Canada 234 per cent respectively of the previous five years' averages.

The quantities of potatoes, onions and other vegetables exported during the last ten years are as follows:

1920	513,938	bushels
1921	470,225	"
1922	379,082	"
1923	318,761	"
1924	416,604	"
1925	313,280	"
1926	426,896	"
1927	371,887	"
1928	420,802	"
1929	333,132	"

The quantity exported in 1929 was 79 per cent of the previous year's export and 70 per cent of the average of the last ten years.

The **gross** value of the exported crop (exclusive of lily buds) was as follows:

TO THE UNITED STATES OF AMERICA

Beets, 473 crates @ $1.04	$ 492	
Carrots, bunched, 750 crates @ $1.13	847	
" loose, 6,747 crates @ $1.65	11,132	
Celery, 73,606 crates @ $3.30	249,524	
Kale, 8,052 crates @ $3.25	26,169	
Lettuce, 167 crates @ $1.18	197	
Onions, 81 crates @ $1.91	155	
Parsley, 32,063 crates @ $ .92	29,498	
Potatoes, 36,170 barrels @ $8.29	299,849	
Tomatoes, 825 crates @ $1.10	907	
Turnips, 105 crates @ $1.25	131	
Miscellaneous vegetables, 308 crates @ $1.00	308	
Lily bulbs, 5,172 cases @ $15.00	75,580	
	$694,789	=£144,748

TO THE DOMINION OF CANADA.

Beans, 513 crates @ $1.24	$ 636	
Beets, 752 crates @ $1.49	1,091	
Cabbage, 309 crates @ $2.94	908	
Carrots, 11,652 crates @ $1.42	16,546	
Celery, 3,341 crates @ $2.51	10,896	
Corn, 201 crates @ $1.76	354	
Onions, 3,419 crates @ $1.49	5,094	
Parsley, 85 crates @ $1.01	86	
Potatoes, 192 barrels @ $3.55	672	
Tomatoes, 23,329 crates @ $1.29	30,094	
Turnips, 34 crates @ $1.38	47	
Miscellaneous vegetables, 660 crates @ $1.29	863	
Lily bulbs, 294 cases @ $15.00	4,410	
	$ 71,697	=£ 14,936

TO GREAT BRITAIN.

Lily bulbs, 350 cases @ £2. 16. 0		£ 980

TO BRITISH WEST INDIES.

Carrots, 188 crates @ 3/-	£ 28	
Cabbage, 87 crates @ 5/-	22	
Onions, 555 crates @ 2/6	70	
Potatoes, 341 barrels @ 20/-	341	£ 461

TO OTHER COUNTRIES.

Lily bulbs, 48 cases @ £2. 18. 0		£ 139
		£161,264

The estimated **local** value of all agricultural products is given below:

EXPORTED.

To United States of America	£ 96,400	
To Dominion of Canada	9,249	
To Great Britain	333	
To British West Indies	287	
To other countries	100	£106,369

CONSUMED LOCALLY.

Potatoes and other vegetables	£ 41,531	
Bananas	30,000	
Milk	83,350	
Eggs and poultry	22,650	
Pork, veal and beef	13,700	£191,231
		£297,600

The above estimate is 105 per cent of that of the previous year, and with respect only to exports 104 per cent.

Below are given the etsimated local values of agricultural produce in the last five years:

1925	£270,500
1926	375,526
1927	324,128
1928	281,938
1929	297,600

The average New York prices in 1913 (basic pre-War year) and for the last five years were as follows:

	1913	1925	1926	1927	1928	1929
Beets	$ .97	$ 1.32	$ 1.68	$ 1.16	$ 1.14	$ 1.04
Carrots	.95	1.29	1.70	1.50	1.40	1.46
Celery	3.40	2.94	8.24	5.32	?.	3.39
Onions	1.53	3.02	1.95	2.52	2.00	1.91
Parsley	1.07	1.45	1.95	1.56	1.40	.92
Potatoes	5.97	14.00	14.75	10.31	9.25	8.29

The Bermuda farm prices, crated, in 1929 were as follows:

Beets	£ – 1 10
Carrots, bunched	– 2 0
Carrots, loose	– 3 5
Lettuce	– 1 1½
Onions	– 4 2
Parsley	– 1 5
Potatoes	1 3 11

The volume of agricultural exports was divided approximately among our four markets as follows:

	1928	1929
United States of America	95.00 per cent	89.00 per cent
Dominion of Canada	4.00 " "	10.00 " "
British West Indies	0.90 " "	0.50 " "
Great Britain	0.10 " "	0.25 " "

MARKETING NOTES.

During the year under report more attention was given to this subject than in any previous year. Interest centered around the rapidly developing Canadian market.

The year's agricultural exports to Canada (exclusive of onions) were 285 per cent of those of last year, and though exports in 1930 will not reach the estimated volume, they will show further increase.

Mention is made under "Director's Visit to Canada and the States" of the visit to Ottawa and Montreal by the Chairman and the Director, and of the latter's survey of other cities and towns of Eastern Canada. The information secured and the personal contacts made should prove of future value.

The vegetables in which Canadian buyers are most interested are tomatoes, celery, cabbage and carrots. These vegetables must be carefully and uniformly graded and packed in attractive containers on which the grade, number and weight of the contents are clearly marked.

Consideration has been given to sales methods, and it has been evident from the first that the indiscriminate consignment of vegetables to a number of receivers in each market is suicidal.

Advertising was considered, and assistance was offered by the Trade Development Board. No definite policy had been decided on at the close of the year, though direct personal advertising was recommended by the Director. A number of circulars was addressed to the trade in Eastern Canada, and a full page advertisement appeared in the Programme of the

Annual Convention of the Eastern Canada Fruit and Vegetable Jobbers' Association. Considerable publicity was given by Eastern Canadian newspapers to the visit of Mr. Spurling and Mr. McCallan. A form of advertising considered was that of exhibiting Bermuda vegetables at the winter fairs of Canada, for at this time vegetables are procurable for display which is not the case at the time of the Canadian National Exhibition.

More Frequent Service to Canada Needed.—Having regard to the quantities exported to the Dominion by the new and excellent service of the Canadian National Steamships, it may appear unreasonable to state at this time that a more frequent service with larger chill-room accommodation is required, but such is the considered judgment of the Board and the Department, who are, however, confident that the requirements of the trade will be met by the managers of the Canadian National Steamships.

Vegetable Crates.—The use of a new type of bushel crate was made compulsory by Regulation, for it had been felt for many years that the old crate was "a back number". The British Columbia twenty-pound flat (containing four baskets) was selected as a tomato container. It is evident to all informed on the subject that increased atttention must be given to the types of crates to be used, the material and construction, and the care they receive from the time they are landed in Bermuda until they arrive, packed with vegetables, at market.

Several Canadian and American manufacturers of crates submitted samples, and the Canadian Wirebound Boxes Limited generously gave 200 sample crates.

Central Packing.—A central packing house, for tomatoes only, was first actively discussed by the Board on 9th July. At the close of the year the matter was still under consideration. Subsequent events indicate that the establishment of a sufficient number of packing houses is essential.

Colonial Mark.—It is the intention of the Board to mark with a "Colonial Mark" all vegetables packed under Government supervision. The design has been selected.

Shipment of Produce Board.—On 1st November the Board recommended to Government the appointment of a board responsible for the distribution of vegetables in Canada. This did not find favour with the shippers, and the measure was lost. As a compromise, it was recommended that the Board and the shippers should meet regularly duing the shipping season of 1930 and discuss the distribution of vegetables in Canada.

Visit of Canadian Representatives.—The visit to Bermuda of Mr. J. A. McBride, Manager of the Fruit Importers Limited, Montreal, and Mr. F. E. Holloway, Supervisor of Mutual Brokers Montreal Limited, both members of the Eastern Canada Fruit and Vegetable Jobbers' Association, increased the Association's interest in Bermuda vegetables.

New York Market.—Shipments of vegetables to New York declined. Domestic competition and high import duties are closing that market to Bermuda vegetables, though it appears probable that early potatoes may still be sold at profitable prices, and other vegetables in times of domestic shortage.

The Assistant Inspector of Produce was in New York during the greater part of the shipping season. His comments and recommendations will be found on another page.

Sale of Bulbs in England.—Interest in Bermuda Easter lily bulbs continued to grow in England. This was largely due to the interest taken by Messrs. Robert Tucker and Company and Mr. F. H. Burn of Pratt and Company (Advertising) Limited. On 12th June the Board recommended that Mr. Boswell Tucker, senior member of the first-named firm be appointed the Board's London representative. This acknowledgment of Mr. Tucker's great service in relation to the sale of bulbs in England was well deserved, for he has been indefatigable in his efforts to increase sales. Mr. Burns' scheme of advertising through Horticultural Societies gave excellent results. As in former years, the Department received assistance from the Empire Marketing Board in a variety of ways, but the Board decided to refrain from asking or accepting assistance that would call for special expenditure at the cost of the British tax payer.

Meetings of Shipment of Produce Committee.—The committee of the Board appointed under the Shipment of Produce Act, 1926, met several times during the year. It is regretted that the matter of celery and kale shipped on consignment in 1928 by certain shippers was not satisfactorily adjusted at the close of 1929.

Home Market.—The Bermuda farmer is waking up to the importance of the market offered for his produce within the Colony, but will not secure the full advantage of it until he adopts business methods in dealing with it. Undoubtedly the quantity of domestic produce consumed locally is increasing.

POTATOES.

Exports of potatoes for the last ten years were as follows:

1920	58,674	barrels
1921	58,955	"
1922	41,999	"
1923	33,604	"
1924	35,254	"
1925	23,488	"
1926	34,475	"
1927	36,072	"
1928	41,301	"
1929	36,703	"

The quantity exported in 1929 was 80 per cent of the quantity exported in 1928, and 81 per cent of the average of the previous ten years. As pointed out last year, a larger proportion of domestic potatoes is now consumed locally than in former years.

Seed potatoes imported from all sources gave general satisfaction because of practical freedom from virus diseases. The attention of importers and farmers was drawn to the advantage of more direct purchase of seed potatoes.

Experimental shipments to New York of potatoes in bushel crates indicated that this form of package should prove popular in that market.

Prices in New York continued to decline, as shown by the following:

1926	1927	1928	1929
$14.75	$10.31	$ 9.25	$ 8.25

The sale of new potatoes in England has received consideration from time to time, and experimental shipments of several varieties, including English Kidneys, have been made, but having regard to the prices obtained, distance and other circumstances, it does not appear necessary to continue shipments.

GREEN VEGETABLES.

Exports of green vegetables for the last ten years were as follows:

1920	260,784	bushels
1921	263,649	"
1922	191,806	"
1923	193,974	"
1924	280,745	"
1925	216,891	"
1926	284,135	"
1927	255,765	"
1928	294,623	"
1929	232,202	"

The quantity exported in 1929 was 78 per cent of the quantity exported in 1928, and 96 per cent of the yearly average of the last ten years.

The exports, in bushels, during the last ten years of each kind of vegetable are given below:

	Beets	Carrots	Celery	Kale	Parsley	Tomatoes	Misc.
1920	35,123	92,736	21,237	17,021	90,285	—	14,889
1921	31,845	115,143	31,979	23,311	64,514	—	8,748
1922	21,947	76,348	28,403	12,397	46,267	—	6,744
1923	28,007	60,894	40,302	16,302	40,688	1,024	6,444
1924	28,984	88,745	67,191	28,053	56,346	1,048	10,378
1925	18,263	62,620	41,210	26,118	56,579	624	11,478
1926	18,075	68,996	74,572	28,599	82,881	3,081	7,931
1927	11,366	44,833	109,302	23,319	55,619	5,294	3,759
1928	15,580	42,250	129,266	41,481	60,318	1,584	4,124
1929	1,205	7,994	155,894	24,156	32,148	8,051	2,754

ONIONS.

Exports of onions during the last ten years were as follows:

1920	109,072	bushels
1921	49,455	"
1922	70,874	"
1923	35,176	"
1924	41,848	"
1925	21,170	"
1926	39,336	"
1927	19,930	"
1928	16,063	"
1929	4,055	"

The quantity exported in 1929 was 25 per cent of the quantity exported in 1928, and 8 per cent of the yearly average of the last ten years.

Onions are no longer an important export vegetable, and unless a market can be established in Canada, will soon go out of cultivation. This is not altogether to be regretted, for it is an expensive crop to grow, and its place is being taken to some extent by other crops calling for less expenditure per acre. Yet it is admitted that some land originally in onions is suitable for no other crops because of shallowness of soil and exposure to wind.

The Bermuda-selected California-grown seed mentioned previously under "Agricultural Station" was distributed to a number of growers, and in every case reports on its behaviour were most favourable. Unquestionably, highly satisfactory results are being secured, and it is proposed to continue the selection.

As the Montreal market prefers red-skinned onions, a small sample of this variety was secured from the United States of America, and sown for the 1930 crop.

"Notes on Bermuda Onions", 3,000 words, was prepared at the request of the Colonial Secretary.

BERMUDA EASTER LILIES.

Exports of Bermuda Easter lily (**Lilium Longiflorum Harrisii**) bulbs during the last ten years were as follows:

1920	749	cases
1921	936	"
1922	1,604	"
1923	3,116	"
1924	3,539	"
1925	4,040	"
1926	4,524	"
1927	6,043	"
1928	7,611	"
1929	5,864	"

The quantity exported in 1929 was 77 per cent of the quantity exported in 1928, and 173 per cent of the yearly average of the last ten years. Unfavourable weather conditions reduced the 1929 crop, and for the first time in eleven years growth of exports cannot be reported.

No less than 88 per cent of the exported crop was shipped to the United States of America, but it is pleasing to record that increasing interest in Bermuda bulbs is shown in Great Britain, Canada and elsewhere. The excellent work being done by Messrs. Robert Tucker and Company and Mr. F. H. Burn of Messrs. Pratt and Company (Advertising) Limited, both of London, is increasing sales in Great Britain. Reference is made to the subject under "Marketing Notes".

The principal reason for the growing popularity of Bermuda bulbs is their freedom from disease. The earlier investigations of Professor H. H. Whetzel and Mr. L. Ogilvie, and those now being carried on by Dr. H. S. Cunningham are securing control of virus and other diseases of lilies. Assistance has been received from Mr. C. E. F. Guterman, Fellow of the Lily Disease Investigation Fellowship of the Horticultural Society of New York, the Boyce Thompson Institute for Plant Research, Cornell University and the New York Botanic Garden. Mr. Guterman was in Bermuda from 1st to 12th February. Mr. Ogilvie, though no longer a member of the Department, has lost none of his interest in Bermuda, and responded more than once during the year to requests to make enquiries regarding the behaviour of Bermuda bulbs in England.

The effort made by the lily growers to form an association for mutual protection was unsuccessful.

FRUIT.

During the year a number of fruit trees, chiefly citrus were imported for land owners. Two growers who are particularly interested in the encouragement of fruit growing, Mr. W. B. Smith, M.C.P., and Mr. Allen Zuill, hope to form an association of fruit growers, and the Board has promised its assistance.

The Plant Pathologist refers to the Mediterranean fruit fly, and the possibility of controlling it.

CONTROL OF PLANT DISEASES AND PESTS.

Attention is directed to the report of the Plant Pathologist.

It is regretted that general progress in the control of plant diseases and pests cannot be reported. Undoubtedly far greater attention is given

to the control of lily bulb diseases, and the grower who does not regularly rogue his fields is becoming the exception. Celery blight is now held in better check, but this may be due less to the vigilance of the growers than of the Department in its inspection of seed. The most serious loss is from the ravages of late blight (**Phytophthora infestans**) of potato.

The Department's two motor spray pumps were employed as follows:

St. Georges	—	days
Hamilton	7	"
Smiths	7½	"
Devonshire	17¼	"
Pembroke	6	"
Paget	18¼	"
Warwick	3	"
Southampton	1	"
Sandys	1	"
Total	61	days

INSPECTION AND REGULATORY SERVICES.

In last year's report will be found particulars of the nature of these services, which relate to (1) contagious animal diseases, (2) exported produce, (3) seed potatoes, (4) vegetable seeds, (5) nursery stock imported and exported, and (6) local plant diseases and pests.

Under the provisions of the Agricultural Inspection Act, 1921, the following firms were registered as seedsmen:

Bermuda Green Vegetable Growers' Association, Hamilton.
Henry Dunkley and Company, Hamilton.
Fred Frith, Warwick.
The Hill Company, Hamilton.
O. R. Loblein, Hamilton.
G. J. Moniz, Smiths.
The E. W. Outerbridge Company, Hamilton.
J. H. P. Patterson, Somerset.
Peniston and Curtis, Hamilton.
T. J. Wadson and Son, Hamilton.

Under the same Act the following were licensed as shippers of lily bulbs:

Henry and Lee, 95 Water Street, New York, and Hamilton, Bermuda
Malcolm Hollis, Harrington Sound.
T. A. Hollis, Crawl.
The E. W. Outerbridge Company, Hamilton.
Theodore Outerbridge, Paget East.
H. E. D. Smith, St. Davids.
Stephens Brothers, Paget East.

At the close of the year the following held licenses as shippers of produce:

Benevides and Rego, Hamilton.
Bermuda Green Vegetable Growers' Association, Hamilton.
J. M. Darrell, Smiths.
R. Darrell and Company, Hamilton.
Henry Dunkley and Company, Hamilton.
The Hill Company, Hamilton.
Ingham and Wilkinson, Hamilton.

O. R. Loblein, Hamilton.
H. T. North, Hamilton.
Pearman, Watlington and Company, Hamilton.
J. Perry and Sons, Hamilton.
J. F. Simons, Paget East.
B. W. Walker and Company, Hamilton.

Regulations governing the inspection of produce and box material were amended extensively, and minor amendments were made to other Regulations. On 12th November the Board approved of amendments made by the Director to the consolidated agricultural acts.

FARM LIVE STOCK.

It is estimated that the Colony's domestic live stock number as follows: Horses, 1,850; mules, 40; donkeys, 15; dairy cattle, 1,750; pigs, 2,000; goats, 400, and poultry, 17,500.

The Government Veterinary Officer reports freedom from serious outbreak of contagious diseases during the year. Dr. Tucker's visit to Washington, D.C., to study control of certain animal diseases should prove of great assistance to him in his control of local diseases. Three animals were slaughtered because affected with **tuberculosis** or other contagious disease.

It is pleasing to report increasing interest in the improvement of dairy cattle. The Guernsey continues to be the most popular breed, and many fine grades of the breed are to be seen throughout the Colony.

The Bermuda Poultry and Pet Stock Association this year combined its Annual Show with the Department's Agricultural Exhibition.

The Department's importation of Angora rabbits has aroused interest in this utility breed, and the production of wool may prove a profitable occupation for a few.

The practising veterinarians asked for and obtained registration under the Veterinary Science Practice Act, 1929. The committee appointed under the Act consists of the Director of Agriculture, Dr. R. L. Tucker, D.V.S., and Dr. F. W. E. Peniston, D.V.S.

FARM LABOUR.

Scarcity of farm labour was felt throughout the year, and was ameliorated by the importation of fifty or more labourers from the Azores. The Director, as a member of the Immigrant Labour Board, received all applications for farm labour.

It is not in the importation of "green" farm labourers, but by improved form management that relief should be sought.

GOVERNMENT HOUSE AND AQUARIUM GROUNDS.

On 21st March the Director of Works and the Director of Agriculture were granted an interview with His Excellency the Governor for the purpose of discussing plans whereby the grounds of Government House might be better maintained. The arrangements then made included the employment, as head gardener, of an employee of the Department of Agriculture, and appear to have given satisfaction to His Excellency.

The planting and maintenance of the Aquarium grounds were wrecked on the shoal of dual responsibility.

ANNUAL AGRICULTURAL EXHIBITION.

The eleventh Annual Agricultural Exhibition was held at the Station on 16th, 17th and 18th April.

The weather was not favourable, for the protracted drought had reduced vegetable and flower exhibits and the rain late on the first day and until early afternoon on the second day reduced attendance. The Exhibition continues to be the most popular annual event in the Colony, for it provides opportunity for all to exhibit and brings together all classes of the community under more or less pleasant and instructive surroundings. Mention is again made of the steady increase in the number of exhibits from the Agricultural Clubs and their improved quality.

The exhibits as a whole more than maintained the standard of previous years, and there was marked improvement in horses, goats and rabbits. Vegetables and flowers were surprisingly good, weather conditions considered. To increase vegetable exhibits, small packets of seeds had been sent to twenty-five persons who exhibited vegetables in 1928.

By actual count 214 persons assisted on committees, as superintendents, judges and in other capacities. The Department is under great obligation to these ladies and gentlemen, without whose valuable help it would be impossible to hold the Exhibition.

A professional poultry judge, Mr. D. J. Lambert of Apponaug, Rhode Island, U. S. A., was engaged with such satisfactory results that it is planned to repeat the experiment in other sections.

It is again mentioned that in scarcely any respect is the equipment of the Exhibition equal to the demands now made on it. Increased housing is required for poultry, food stuffs and arts and crafts. Better accommodation is called for in respect to flowers. An Exhibition office is needed.

The following figures show the growth of the Exhibition since 1922, when it was first held after the Great War, and a comparison between 1928 and 1929:

	1922	1928	1929
Estimated number present	7,300	15,000	14,000
Number of entries	964	4,702	5,303
Value of prizes	£ 242	£ 573	£ 587
Total receipts	£ 611	£1,117	£1,219
Total expenditure	£ 503	£1,117	£1,218

Below are given in detail the number of entries in the three years:

	1922	1928	1929
Horses	86	160	172
Cattle	46	81	90
Pigs	2	11	11
Goats	25	44	51
Rabbits	13	87	96
Poultry	37	362	331
Dogs	43	81	104
Vegetables	88	415	486
Fruits	9	84	104
Flowers	181	1,164	1,250
Food Products	136	733	957
Arts and Crafts	291	1,480	1,651
Miscellaneous	7	—	—
Totals	964	4,702	5,303

FINANCIAL STATEMENT.

RECEIPTS.

	1928	1929
Balance brought forward	£ 1 12 3	£ – – 1
Granted by Appropriation Acts	300 0 0	400 0 0
Donated by sundry persons for special prizes	10 3 0	32 13 0
Gross receipts for advertisements in catalogue and programmes	131 3 0	136 3 0
Ground rents	55 6 6	58 15 0
Commission on amusement stands	8 2 7	5 18 0
Entry fees	19 18 6	26 9 0
Gate receipts	431 13 4	409 6 11
Enclosure receipts	112 12 2	107 17 7
Checking bicycles	31 2 2	24 13 5
Unpaid adult prize money	14 13 6	16 19 6
Miscellaneous receipts	1 10 0	– 4 0
	£ 1,117 17 0	£ 1,218 19 6

EXPENDITURE.

	1928	1929
Prizes to adults	£ 417 8 0	£ 392 8 0
Prizes to Agricultural Clubs	138 6 6	167 11 2
Prizes for sports	19 16 9	27 1 5
Advertising	22 0 6	20 2 1
Catalogues and programmes, printing and commission on advertisements	86 2 6	120 8 8
Stationery and printing	39 5 10	55 8 8
Lumber	32 1 1	44 2 11
Other material	79 10 10	72 14 2
Bands and amusements	30 0 0	46 16 0
Carriages and teas for band and others	15 4 11	7 12 7
Cartage of exhibits	9 19 0	12 6 0
Expenses of poultry judge	– – –	20 7 9
Labour, field	80 16 7	97 6 6
Watchmen	6 0 0	6 0 0
Gatekeepers	26 17 6	26 5 0
Checking bicycles	11 0 0	10 10 0
Clerical assistance	50 17 8	47 0 8
Cartage	17 10 0	11 16 0
Depreciation, rental, etc. of Government stores	21 8 3	26 11 11
Lighting, telephones and miscellaneous	13 11 0	3 11 6
Balance	– – 1	– 18 6
	£1,117 17 0	£1,218 19 6

A larger number than usual of liberal special prizes were generously donated, and did much to encourage competition. Below are given the names of the donors and winners of the prizes donated this year and of challenge cups:

General Sir J. J. Asser, K.C.B., K.C.M.G., K.C.V.O., silver challenge cup (donated in 1927) for Parish showing most improvement over its previous year's performance. Won by St. Georges Parish, and held by Mr. H. R. T. Smith.

Messrs. James Carter and Company, Raynes Park, England, silver challenge cup for best collection of vegetables and flowers (six of each) grown from firm's seeds. No award.

Mrs. J. Montgomery Sears, silver challenge cup for largest number of points won for annual cut flowers. Won by Miss L. S. Moncure Robinson, Paget.

Mrs. J. Cameron Bradley, fourteen dollars for best Guernsey female. Won by Mr. B. C. C. Outerbridge, M.C.P., Smiths.

Mrs. J. Cameron Bradley, twelve dollars for best Guernsey male. Won by Mr. F. C. Stephens, Paget.

Mrs. J. Cameron Bradley, twelve dollars for best Bermuda-bred grade Guernsey female. Won by Dr. F. W. E. Peniston, Smiths.

Bermuda Society for the Prevention of Cruelty to Animals, two pounds and one pound respectively for the two best cared for truck horses owned by men who drive their own horses. Won by Mr. Fred Smith, Pembroke, and Mr. Duncan Eve, Smiths.

Bermuda Society for the Prevention of Cruelty to Animals, two pounds and one pound respectively for the two best cared for hack horses from stables of not more than four horses. Won by Mr. H. Bean Wilson, Pembroke, and Mr. Bernard Parris, Pembroke.

Messrs. Pearman, Watlington and Company, four bags of Purina Chick Feed, one bag each for (1) best pen of an American breed, (2) best pen of heavy breed exclusive of American, (3) best pen of light breed, (4) best bird in show. Won respectively by Mr. Jack Hallett, Pembroke; Miss Sarah Jackson, Devonshire, Haulbowline Farm, Smiths, and Messrs. Christensen Brothers, Pembroke.

BOYS' AND GIRLS' AGRICULTURAL CLUBS.

Every school in the Colony has opportunity to organise an Agricultural Club, and no less than thirty-two Clubs exhibited at the year's Exhibition. Ex-pupils under the age of eighteen are permitted to join the Clubs of their former schools. Owing chiefly to the Department's inability to devote more time to the matter, the activities of the Clubs are almost entirely confined to the Annual Exhibitions, at which the number of the Club entries have rapidly increased as the following figures show: 1922, 300 entries; 1923, 893 entries; 1924, 1,555 entries; 1925, 2,304 entries; 1926, 1,662 entries; 1927, 2,427 entries; 1928, 2,633 entries, and 1929, 3, 249 entries. Not alone have the Club exhibits increased in numbers, but have improved in quality also, particularly in handicraft. This is very pleasing to all interested in the youth of the Colony, particularly to the donors of special prizes who have done much to increase the children's interest in the competitions.

Following are the names of donors and winners of special prizes:

Mr. W. J. H. Trott, M.C.P., silver challenge cup for the Club showing the greatest improvement over its previous year's performance. Won by Southampton East School Club.

The Bermuda Green Vegetable Growers Association, * silver challenge cup for the boy winning the largest number of points for vegetable prizes. Won by Frank Mello, Whitney Institute School Club.

Honourable W. E. Jackson, C.M.G., * silver challenge cup for girl winning the largest number of points for vegetable prizes. Won by Margaret Mello, Whitney Institute School Club.

Honourable J. P. Hand, C.M.G., M.B.E., M.C.P., * silver challenge cup for Club exhibiting best vegetables from its school garden. No award.

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* Transferred from Corn competitions.

Mrs. J. Montgomery Sears, silver challenge cup for Club showing greatest improvement over its previous year's performance with respect to points won for cut flowers. Won by Sandys Grammar School Club.

Dr. H. S. Cunningham, Britton's "Flora of Bermuda" for best collection of pressed plants. Won by Paget Glebe School Club.

Bermuda Society for the Prevention of Cruelty to Animals, two prizes of ten shillings each for humane posters. Won by Ruth Masters and Marion Christensen, Mount St. Agnes Academy Club.

Mr. William Murphie, silver challenge cup for competition within Bermuda High School. Won by Barr House and held by Frances Christensen.

Following is a comparison of the number of Club entries received in 1922, 1928 and 1929:

	1922	1928	1929
Horses	4	6	3
Cattle	4	8	13
Pigs	–	–	1
Goats	10	19	36
Rabbits	10	65	61
Poultry	10	147	98
Dogs	6	31	57
Vegetables	33	166	442
Fruits	–	37	59
Flowers	9	388	330
Food Products	37	490	712
Arts and Crafts	173	1,276	1,437
Miscellaneous	4	–	–
	300	2,633	3,249

For several years the Woodlands School Club has held a Club exhibition previous to the Agricultural Exhibition, and their excellent example has been followed this year by the Sandys Grammar School Club. The last named Club and the Warwick Academy Club alone enjoy the privileges of school gardens. The seed issued to the Clubs, 1,800 packets in 1929, is planted for the most part around the children's homes.

VISIT AND MEETINGS.

Below is given the number of recorded visits paid by members of the Department to farms, gardens, schools and other places.

Parish	Director	Plant Pathologist	Assistant	Inspector	Horticulturist	Veterinarian	Totals
St. Georges	16	100	8	–	22	15	161
Hamilton	2	70	25	23	26	19	165
Smiths	8	69	41	57	12	18	205
Devonshire	17	60	33	42	29	10	191
Pembroke	17	44	54	26	70	50	261
Paget	27	63	52	45	65	19	271
Warwick	7	15	40	13	19	15	109
Southampton	10	21	44	10	2	7	94
Sandys	20	26	44	2	10	4	106
Totals	124	468	341	218	255	157	1,563

The number of visits paid in 1929 were 108 per cent of the number paid in 1928 and 123 per cent of the average of the last five years.

The sum spent for local travelling amounted to £34. 0. 9. or an average of five pence per visit. This is false economy, and adequate provision for travelling should be provided the members of the Department.

Meetings were held in Hamilton Parish, Paget, Warwick and Southampton for the purpose of advising farmers regarding the Canadian market. The Director addressed several meetings of shippers and seed potato importers, and the Girl Guides. The Director addressed a few of the schools, and the Assistant nearly all. The Horticulturist addressed the Pembroke Arbor Society and the Somerset Garden Club and some schools.

DIRECTOR'S VISIT TO CANADA AND THE STATES.

Early in the year the Board decided that the Director should visit Eastern Canada to secure first hand information about the Canadian market. Subsequently the Honourable the House of Assembly selected the Honourable S. S. Spurling as its representative to join the Director in Montreal. Together the Chairman and the Director interviewed the Canadian Minister of Finance and other Government officials, the management of the Canadian National Steamships, and vegetable brokers and jobbers in Montreal. A joint report, dated 26th August, was presented on their return and with it were enclosed letters addressed to the Minister of Finance, and the manager of the Canadian National Steamships.

The Director left Bermuda on 25th June and returned on 16th August. In addition to surveying the vegetable market of Eastern Canada, referred to under "Canadian Market", seed potatoes were inspected in Long Island. N. Y., Prince Edward Island and Nova Scotia; information was obtained about box material, tomato wrappers, printing on crates and advertising; a brief survey was made of the New York market, and other matters were given attention. A report was presented on 19th August, and the matters dealt with are for the most part included in this Report.

By Resolve 2 of 1929 funds were provided by the Honourable the House of Assembly to send a deputation to Washington to place before the Government of the United States of America, through the British Embassy, the trade relations existing between that country and Bermuda. His Excellency the Governor appointed Mr. J. D. B. Talbot, M.C.P., and the Director, who were absent from the Colony from 26th December, 1928, to 7th January, 1929. With the assistance of the Commercial Secretary of the Embassy, a brief was prepared for presentation through the proper channels. Copy of this brief was forwarded to His Excellency on 11th February, and subsequent minutes on the subject were forwarded. Other briefs were later prepared. The Acting Director of Agriculture prepared a brief, dated 3rd August, on export of lily buds to the States.

STAFF.

Mr. E. A. McCallan, Director, was appointed with Mr. J. D. B. Talbot, M.C.P., to make representation in Washington regarding trade relations with the United States of America, and was absent from the Colony from 26th December to 7th January. With the Acting Chairman, Honourable S. S. Spurling, the Director made representation at Ottawa concerning trade relations with the Dominion of Canada, and for this mission, a survey of Eastern Canadian markets, the inspection of seed potatoes and other official business, was absent from 25th June to 16th August. Mr. McCallan was appointed a member of the Committee under the Veterinary Science Practice Act, 1929, was re-appointed a member of the Immigrant Labour Board, and continued to serve as a Marsh Reclamation Commissioner.

His resignation from the last-named body was accepted late in the year under report.

Dr. H. S. Cunningham, Plant Pathologist, attended at his own expense the meetings of the American Phytopathological Society and the American Association of Science held in New York from 28th to 31st December. When in the United States Dr. Cunningham investigated, at Government expense, the behaviour of Bermuda Easter lilies under glass, and was absent from 26th December, 1928, to 7th January, 1929. From 14th September to 11th October Dr. Cunningham was absent in Canada and the United States on vacation leave. During the absence of Mr. McCallan, Dr. Cunningham acted as Director, and was appointed temporarily a member of the Immigrant Labour Board.

Mr. W. R. Evans, First Agricultural Assistant, was, with permission, elected Honorary Secretary-Treasurer of the Poultry and Pet Stock Association. Mr. Evans was on sick leave from 8th to 14th February, and on vacation leave from 1st August to 30th September.

Mr. E. L. Adams, Inspector of Produce, was absent on sick leave from 4th to 16th February, and from 5th to 26th May.

Dr. R. L. Tucker, Government Veterinary Officer, attended the laboratories of the Bureau of Animal Industries, United States Department of Agriculture, to study certain animal diseases, and was absent for this purpose and for three weeks vacation from 13th July to 12th August. Dr. F. W. E. Peniston acted as his locum tenens. Dr. Tucker was appointed a member of the Committee under the Veterinary Science Practice Act, 1929.

Mr. J. C. Nauen, Horticulturist, was absent on sick leave from 6th to 9th February, and on vacation leave in the United States from 9th July to 2nd August.

Miss Hilda C. Lines, Clerk to Board and Director, was absent on sick leave from 2nd September to 14th October, during which time Miss Dorothy M. Mitchell filled the office temporarily.

Mr. T. Arthur Hollis was re-appointed Assistant Inspector of Produce and held office from 1st January to 30th June. He was on duty in New York Market from 5th January to 1st March, and 6th April to 8th June. In July Mr. Hollis was temporarily employed to visit the Montreal market.

Messrs. E. C. Case, C.V.S. Early and A. W. Doe were re-lected Sub-Inspectors of Produce. On 8th May Mr. J. W. M. Gibbons was elected a Sub-Inspector.

FINANCIAL.

The expenditure of £4,360. 0. 0. was authorised by the Appropriation Act of 1928, this sum being exclusive of salaries. The sum of £4,348. 6. 10. was expended, and a balance of £11. 13. 2 remained at the end of the year. The sum of £193. 0. 1. was reimbursed to the Treasury, and produce to the value of £158. 1. 9. was supplied to Government and other institutions. Details of receipts and expenditure will be found in the Appendices.

During the last ten years the expenditure (exclusive of salaries) and receipts have been as follows:

Year	Expenditure	Receipts
1920	£3,126 6 6	£209 4 6
1921	5,488 15 2	176 1 11
1922	6,905 18 2	68 17 4
1923	4,163 6 10	75 0 11
1924	4,515 10 8	182 19 3
1925	4,851 16 7	129 18 9
1926	5,169 6 5	207 8 9
1927	4,560 15 5	346 2 4
1928	4,175 5 11	157 10 8
1929	4,348 6 10	193 0 1

Respectfully submitted,

E. A. McCALLAN,
Director of Agriculture.

Agricultural Station, Bermuda,
2nd June, 1930.

Report of the Plant Pathologist, 1929.

Director of Agriculture,

I have the honour to submit my annual report for the year 1929.

Record of Movements, etc.

During the first week in January I visited a number of greenhouses in the vicinity of New York City for the purpose of gaining first hand information regarding the condition of Bermuda-grown Easter Lilies. I acted as Officer-in-Charge of the Department from 19th January to 8th February. I was Acting Director of Agriculture from 25th June to 16th August. I was absent on vacation leave from 13th September to 11th October.

Special Reports.

Special reports on the following subjects were submitted to the Board of Agriculture:

Plant Pathologist's Visit to New York, December 26th, 1928 to January 7th, 1929. (Dated 9th January, 1929.)

First Inspection of Lily Fields. (Dated 6th March, 1929.)

Inspection of Lily Fields, 1929. (Dated 13th May, 1929.)

The Mediterranean Fruit Fly. (Dated 30th November, 1929.)

Exhibition.

As has been the custom in the past, a booth was put up during the week of the Annual Exhibition in which were exhibited a number of the more common plant diseases and insect pests occurring in Bermuda. Samples of spraying and dusting materials, together with various types of spraying and dusting machines, were also exhibited. Literature dealing with the control of plant diseases and insect pests was distributed. I was in attendance throughout the period of the Exhibition to discuss with the growers their various problems. Unfortunately very few of those in attendance at the Exhibition availed themselves of the opportunity offered by this educational feature. The great majority of the people attend the Exhibition during the afternoon, and at that time there are special attractions in the show-ring in which all are interested. In view of the immense amount of time involved in the preparation of such a booth and the small amount of interest shown in this feature, I would recommend that it be discontinued in the future. I feel that far more would be accomplished by circulating amongst the growers present and discussing their problems with them.

Spraying Machines.

Owing to a serious break, one of the power sprayers belonging to the Department was out of commission during the greater part of the year. The break was of a more serious nature than at first supposed, and practically necessitated replacing the power plant. After considerable delay the necessary parts were obtained, and this machine is now in good condition.

The traction duster purchased by the Department in 1928 was put in operation this year. One of our largest growers used the machine once, and although it was doing splendid work refused to use it again. In spite of the fact that the machine was capable of dusting four rows at the same

time and required the use of only one man and a horse, he preferred to use small hand sprayers instead. In this case the fields were provided with head ridges, and there was ample opportunity to turn without injury to the potatoes. As is customary with our growers, however, the potato rows were spaced only twenty inches apart. It seemed impossible to convince this man that any slight injury caused to the plants by the passage of the machine incurred infinitely less loss than the amount of labour involved in spraying with hand pumps. Owing to the fact that many of the fields in Bermuda are surrounded by walls or hedges and are planted in most cases without head ridges, I fear that this machine will not be used to any extent by our growers. This is unfortunate, for the use of such a machine would very materially cut down the present cost of applying fungicides.

Inspection Services.

During the year 458 visits to farms and gardens were made by me, 297 parcels of nursery stock were inspected at the Post Office and 183 parcels at the docks.

Inspection of Lily Fields.

Two inspections of lily fields were carried out during the season. The first inspection was commenced on 29th January and completed on 7th March. Bad weather and press of other work resulted in this inspection covering a longer period of time than was at first anticipated. The second inspection was commenced on 18th March and brought to completion on 6th April.

Carrying on two inspections of lily fields during the season involves considerable time, but it was felt that the time was well spent in that it kept one in close touch with the lily fields throughout the season and furnished data which was invaluable in making a decision as to the disposal of fields after the final inspection was completed. It also served to keep the careless grower awake to the necessity of roguing his fields early if he was to get a certificate covering the sale of his bulbs. It is recommended that two inspections be the rule in the future and that a standard be set for the first inspection as is now the case in the second. The standard for the first inspection should, however, be somewhat less rigid than that set down for the second inspection.

The majority of the fields were up to the standard at the time the second inspection was made, and on the whole the bulbs shipped from the Colony this year were remarkably free from virus diseases and were true to type.

Breeding Work.

A start was made this year in the breeding of lilies with the idea of improving the shipping quality of the flower. In the absence of suitable varieties to cross with the native Harrisii and through the kindness of Mr. C. E. F. Guterman of Cornell University, pollen was brought in from the United States. As a result of the crosses made, a fine lot of seed was obtained and at the time of writing a large number of seedlings are being grown. It is planned to continue this work next year using other varieties. I had planned to obtain bulbs of suitable varieties to grow in Bermuda in order to make reciprocal crosses, but was unable to secure bulbs this season.

Office Duties.

Considerable progress has been made during the year in indexing the literature now in the Station library. This work is an important one and will be extremely useful when completed. Owing to the lack of sufficient clerical help, I have been obliged to carry on this work in my spare moments, and I have frequently found it impossible to keep up with the current literature, to say nothing of the back volumes now on the shelves. In fact, it is largely owing to volunteer aid that so much progress has been made during the year.

Other office duties consisted of correspondence relative to Plant Pathological problems, the writing of reports, and contributions to the Monthly Bulletin.

Mediterranean Fruit Fly.

The seriousness of this pest to the fruit industry of Bermuda is well known. This problem is a live one at the present time, and considerable thought is being given to the possibility of ridding the Colony of this pest. An extensive clean-up campaign was carried on some years ago without any very great success. Whatever information may have been gathered during that period unfortunately was never properly recorded, or at least I have not been able to find any records excepting a meager amount of information published in a small Bulletin. This is evidently largely a compilation and gives little information dealing directly with Bermuda conditions. Such information is badly needed in order to intelligently carry on a campaign against this pest.

Work has been started to determine the number of generations produced during the year and the relation of temperatures to the number of generations. An effort is also being made to determine, as definitely as possible, the host fruits found growing in Bermuda. Undoubtedly these are far more numerous than earlier workers supposed.

Diseases and Pests.

Beets.—Early sowings of beets suffered severely from the ravages of the Fireworm (*Xylomyges eridiana*). Early and frequent applications of arsenate of lead would hold this insect in check, but too often control measures are delayed until too late to be effective.

Cabbage.—Cabbage and other cruciferous crops were severely injured by the larvae of the cabbage butterfly (*Pieris rapae*). This butterfly is extremely plentiful, and the larvae do extensive damage each year.

Calendulas.—Plantings of Calendulas throughout the Colony were badly infested with Aster yellows. This disease is found on a wide range of hosts in Bermuda. The only remedy is the removal of all diseased plants as soon as they can be detected.

Celery.—Late blight caused by the fungus *Septoria apii* was reported from a few plantings during the season. In most cases little injury was done, although a few growers who failed to spray or dust suffered severely from this disease. The seed imported for use during the year was remarkably free from *Septoria* pustules, and with reasonable care in the seed beds little trouble should have been experienced by the growers.

In a few plantings scattered plants were found to be affected by nematodes. In no case, however, was there any extensive injury from this cause.

"Black heart" occasioned heavy losses in certain fields, particularly towards the latter part of the season.

Celery in the seed beds during December was severely injured by the Tarnished plant bug (*Lygus pratensis*).

Citrus.—A very small crop of Citrus fruit was borne by the trees in the Station orchard this season. This small set of fruit was universal throughout the Colony, and was in all probability due to the extreme drought experienced in the early part of the season.

At the present time there is an increased interest in the growing of Citrus fruits, and considerable stock has been imported during the season. This is to be encouraged. There is no reason why Citrus fruits should not be grown in the Colony in sufficient quantities to supply the demands for home consumption, at least during a portion of the year. The greatest drawback to successful Citrus culture is the presence of the Purple Scale (*Lepidosophes beckii*). This difficulty can be overcome by systematic and thorough spraying, and presents no more of a problem to the Bermuda grower than it does to growers in other Citrus districts.

Two outbreaks of Anthracnose (*Gloeosporium limetticolum*) on limes were reported during the year. Both of these cases were severe. One grower resorted to spraying with Bordeaux mixture, and reported excellent results from this treatment.

Lettuce.—Lettuce "drop" was common in many plantings throughout the season. The causal organism (*Sclerotinia sclerotiorum*) is found in most soils throughout the Colony, and takes heavy toll not only of the vegetable crops but also of many of the garden annuals.

Lilies.—In December many of the lily fields were severely injured by *Phytophthora* rot. In some fields there is always a certain percentage of lilies affected by this organism just as the plants are coming through the soil. The trouble is always aggravated if the rainfall happens to be heavy during this period, as was the case this season. The trouble was present in the majority of the fields throughout the Colony, and the loss due to this cause will be a heavy one.

Yellow-flat, one of the most destructive of the virus diseases common to the Easter lily, was present to some extent in all the fields in the early part of the season. In a few fields the percentage of affected plants was abnormally high. As the season advanced, continued roguing on the part of the growers reduced this trouble to a minimum.

Mosaic, in one form or another, was found in all fields. This disease offers an even more serious problem than does the yellow-flat. In the case of the yellow-flat the symptoms are more easily recognised and are not likely to be masked, as is often the case in mosaic. The growers are now, for the most part, fully conscious that plants affected with yellow-flat are both useless and dangerous, and are not averse to roguing them out. Many of the growers, however, are not so willing to remove plants affected with mosaic. They still cling to the idea that the plants will recover and the bulbs will be normal. Those growers who are making a practice of shipping cut stems have come to realise that plants affected with mosaic are of no value. Even if the bud is normal, the spotted foliage presents an unsightly appearance which detracts from the value of the stem.

Only one case of *Botrytis* blight was noted during the season. This field was severely affected but fortunately was well isolated.

Oleander Scale.—Several scattered outbreaks of the scale (*Aulacaspis pentagona*) were reported on the Oleander (*Nerium oleander*) during the summer months. In the case of one severe outbreak in Somerset, spraying with lime-sulphur was resorted to. This scale is commonly found on a great variety of host plants throughout the Colony but is kept in check by the parasite *Aphelinus diaspidis*, introduced several years ago.

Onions.—During the months of April onions throughout the Colony were severely injured by thrips (*Thrips tabaci*). In all cases, before the infestations were reported the insects were too well established for control measures to be effective.

Palmetto Scale.—No further spread of the Palmetto scale (*Comstockiella sabalis*) has been noted during the year. Through the kindness of Dr. E. W. Berger, parasitised material was received from Florida. Parasites were reared from this material, and released both on St. Davids Island and at Shelly Bay. Later examinations have shown that the scale on the Palmettoes growing at Shelly Bay is parasitised, but whether this parasite is the same one received from Dr. Berger has not yet been determined.

Potatoes.—Late blight (*Phytophthora infestans*) was first reported early in February. Where the growers failed to take any measures to control this fungus, the injury was severe.

Early blight (*Alternaria solani*) was common in the Fall crop of Triumphs, and severe injury resulted.

Sweet Peas.—One planting of sweet peas was badly affected with Anthracnose (*Glomerella rufomaculans*) during the season. A heavy loss of bloom resulted before the infestation was reported. Spraying the plants with Burgundy mixture gave very satisfactory results in controlling this trouble.

Stem rot (*Sclerotinia sclerotiorum*) was found to be present to a greater or less extent in most plantings of sweet peas. In some cases the injury was severe, and as a result, a large percentage of the plants were lost. Much of this trouble is due to the practice of planting year after year in the same soil already infected.

Root rot, caused chiefly by a species of *Rhizoctonia*, is prevalent throughout the Colony. The use of organic mercury compounds gives some relief from this trouble, but the practice of growing sweet peas year after year in infected soils makes it exceedingly difficult to stamp out this disease, particularly when climatic conditions are unusually favourable to the rapid development of the fungus during the Autumn and Winter months.

Tomatoes.—Leaf blight caused by *Septoria lycopersicum* was common throughout the season and caused severe defoliation. This disease may be kept in check by spraying or dusting with Bordeaux preparations. Treatment should begin in the seed bed, and applications must be made regularly if it is to be successful.

Tomato plants at the Agricultural Station were severely injured by *Sclerotinia sclerotiorum*. Infection invariably occurred at some distance above the surface of the ground, in some cases as high as three feet above ground surface. The stalk above this point was entirely girdled and sclerotia were produced in abundance within the pithy area.

Phoma rot, caused by the fungus *Phoma destructans*, was found on several occasions. This was apparently confined entirely to the fruit, and in no case was there a severe outbreak.

Early in May one planting of tomatoes was found to be severely infested with mealy bugs. Several methods of treatment were tried with very little success. On plants with such tender foliage as that of the tomato, any treatment which promises to be successful against this insect will also injure the foliage.

The mealy bug problem is an important one in Bermuda, and efforts are being made to introduce parasites in the hope of controlling this pest.

Leaf-mold (*Cladosporium fulvum*) was prevalent in field plantings of tomatoes during December, and caused severe injury in some cases. Frequent and thorough spraying of the tomato plots at the Station with Bordeaux mixture was successful in checking the ravages of this fungus.

Tung-Oil.—Tung-oil seedlings at the Station suffered from a severe spotting of the foliage. The causal organism was found to be a species of *Pestallozia*. This planting was in close proximity to a row of loquat trees whose foliage suffered from a similar spotting. The microscopical characters of the two causal organisms were similar in every respect, but cross inoculations have not been made to prove that the two organisms are identical.

In the month of May a number of these seedlings were found to be suffering from a severe die-back. Further examination showed the casual organism to be a species of *Phoma*. Fruiting bodies were produced in abundance on the diseased portion.

Respectfully submitted,

H. S. CUNNINGHAM,
Plant Pathologist.

30th January, 1930.

Report of the Inspector of Produce for the Season of 1928-1929.

The Director of Agriculture,

I have the honour, under the provisions of The Agricultural Inspection Act, 1921, to present my report of the inspection of seed potatoes, produce, box material and lily bulbs, as well as of other duties performed.

INSPECTION OF SEED POTATOES.

Triumphs.—Imported from Nebraska 375 bags (120 lbs. each) for March planting, and to be replanted for early Fall crop; from Long Island, N. Y., 2,325 barrels; and from Canada, 405 barrels, to be planted for Fall crop.

Cobblers.—From Nova Scotia 5,844 barrels, and from Prince Edward Island 400 bags (90 lbs. each) and 200 barrels.

Quality of Seed.—The Triumph seed was sound when inspected; a portion was very small, but on the whole what I have seen growing looks well. The Garnet seed was of the best quality with respect to the appearance of the tubers. The Irish Cobbler seed was good, and superior to former importations of this variety.

INSPECTION OF PRODUCE.

The first shipment of potatoes and kale was made on 17th November, 1928.

The following comments are made on the various vegetables shipped.

Beets were poor and small in quantity.

Carrots were good on the whole but not large, and the majority were shipped without tops.

Celery was good throughout the season; little blight appeared. Three weeks before the last shipments were made we had too much rain, which caused a loss in some sections from water remaining on the land too long.

Kale was very good with freedom from yellow leaves. The quantity was below that of the previous year.

Onions were of poor quality and very small in quantity.

Parsley was poor in quality during the first shipments, but some weeks later this improved very much.

Potatoes.—A large proportion of the Fall crop was grown from Bermuda seed. Forty to fifty per cent were Garnets, also grown from Bermuda seed. The yield of Irish Cobblers was small and did not keep well.

Tomatoes.—The tomato crop was larger than that of the preceding year, and the fruit was better packed when offered for shipment.

QUANTITIES SHIPPED.

	United Kingdom	Canada	West Indies	U.S.A.	Other Countries	Total	
Beets	—	257	—	—	—	257	bushels
Cabbage	—	927	87	—	—	1,014	"
Carrots	—	309	188	7,497	—	7,994	"
Celery	—	8,682	—	147,212	—	155,894	"
Corn	—	201	—	—	—	201	"
Kale	—	—	—	24,156	—	24,156	"
Lettuce	—	—	—	167	—	167	"
Onions	—	3,419	555	81	—	4,055	"
Parsley	—	85	—	32,063	—	32,148	"
Potatoes	—	192	341	36,170	—	36,703	barrels
Tomatoes	—	7,776	—	275	—	8,051	bushels
Turnips	—	34	—	105	—	139	"
Miscellaneous	—	669	—	308	—	977	"
Lily bulbs	350	294	—	5,172	48	5,864	cases

Total number of **green** vegetables shipped, 232,202 bushels.

Produce Rejected.—The following produce was rejected on first inspection:

Celery	1,287	crates	or 1.65 per cent
Kale	50	"	" 0.62 " "
Onions	104	"	" 2.56 " "
Potatoes	1,007	barrels	" 2.74 " "
Tomatoes	60	crates	" 0.24 " "
Other vegetables	436	"	" 1.03 " "

Much of the above was passed when inspected the second time after corrections had been made in it.

Appeals and Prosecutions.—None.

Supervision of Chill-Rooms.—Throughout the season the chill-rooms on the steamers were freqently inspected by Sub-Inspector Case and myself, and I have the satisfaction of reporting that the stowage was good at all times. Breakage of crates was much less than in former years, due in large measure to better crate material.

Assistant Inspector in New York.—The Assistant Inspector of Produce, Mr. T. Arthur Hollis, was in New York a considerable part of the season. The quantities shipped by each boat were cabled to Mr. Hollis, and information regarding the crop was forwarded him by letter.

Acknowledgment.—I wish to record my personal appreciation of the courtesies of the Wharfingers, the Dock Purser and the Chief Engineer of the "Fort Victoria" in connection with the loading and carrying of the crops.

INSPECTION OF BOX MATERIAL.

Under regulations made by the Board on 13th September, 1927, all box material imported was inspected. The importations were of better quality than those of former years.

INSPECTION OF LILY BULBS.

Bulb inspection began on 27th June and continued at seven packing sheds until the latter part of August. The bulbs were much superior to those of former years, but the crop was smaller than that of the preceding year. Basal rot was but little seen. The field inspections of the Plant Pathologist rendered much easier my inspections at shipping time.

FARMERS' MARKET.

During the season under report a varied lot of produce was offered for sale, and I am pleased to state that all the stalls (five in number) were occupied during the year. In the latter part of the year another stall was added in place of the two daily stalls that were not often occupied. The vendors informed me that they were satisfied with their sales on the whole.

SUMMER DUTIES.

Other summer duties were reported on monthly.

RECOMMENDATIONS.

Carrots and Other Root Crops.—In growing root crops, I would again recommend that less nitrate of soda be used. More barnyard manure would be preferable, and seed sown thinly would avoid the expense of thinning the seedlings.

Packing Houses.—A central packing house should be provided for the grading and packing of tomatoes as soon as practicable, also one for lily bulbs.

Farmers' Meetings.—More frequent meetings of farmers should do much to educate and to help the farmers to grow and pack better produce. The present day grading and packing is far behind that of other countries.

Respectfully submitted,

E. L. ADAMS,
Inspector of Produce.

Devonshire,
16th May, 1930.

Report of the Government Veterinary Officer, 1929.

The Director of Agriculture,

The year 1929 was at times and for short periods one of peculiar anxiety. The veterinary service of the Department has always prided itself as being singular because it has not had to deal with many of the more remote animal diseases, but during the year under report some diseases that are rife in other countries have made their appearance in live stock throughout the Colony. One of these has been affecting our cattle for some time, and has given dairymen great anxiety. I refer to epizootic contagious abortion. This form of abortion may be communicated from the bovine to other domestic animals, and once it enters a premises is very difficult to eradicate. The disease is carried into the system by a special baccilus by way of the mouth or by the vagine, and inhabits the space between the womb and foetal membranes, causing them to separate unnaturally, thereby causing the foetus to be eliminated between the sixth and eighth month of pregnancy. Milk from affected animals consumed by human beings, according to some authorities, may produce a disease in them similar to Malta fever, and it was because of circumscribed outbreaks in one or two dairies that a visit to Washington was thought advisable. During July I proceeded thereto. Every facility was afforded me by the authorities and workers at the Experimental Station to gain information regarding the disease. During the visit I attended lectures and conventions which were addressed on the subject by scientists who are putting into it their best energy. I investigated the tests from the blood letting to the agglutination of the same, and gained considerable information that apart from this visit would have been impossible to have secured. Since my visit no new cases have been reported, but this is not unusual, as it is a disease that disappears from a herd for a time and when one is optimistic regarding it reappearing, the herd may unexpectedly become affected with it again.

It was during the early part of the year that hogs became affected with a disease quite similar to hog cholera, of which this Colony has been spared for quite a number of years, namely, Haemorrhagio Septicaemia, a disease causing, as a rule, rapid emaciation and death in ninety per cent of the animals affected, but by rigid quarantine and vaccination this malady was placed under control in a very short time, and only assumed an enzootic form in one locality. Strange to say, an important work that was going on during my visit to Washington was along this line, and although experiments showed that this disease (though differing from swine plague) may be prevented by the use of the serum used for the control of that disease—a very important finding.

It was also early in the year that a case was reported to me of a cow showing nearly all the external symptoms of that dread disease anthrax. This animal was very closely watched, and gave the human medical authorities and myself considerable anxiety. Tests were made by the inocculation of small animals, but nothing positive was forthcoming; at any rate, the cow was immediately destroyed and buried in lime in accordance with agricultural regulations.

Tuberculosis has been on the decrease. Of 237 cows under test during the year not two per cent reacted to the tuberculin test, which in the

majority of cases was applied hyperdermically and at times in conjunction with the opthalmic reagent.

Distemper in dogs was quite prevalent throughout the winter months, and every owner was restless until his dogs had, as was thought, been made immune by vaccination against the disease. I would warn owners of this class of animal not to be too optimistic regarding vaccination being infallible, because this has not yet been proven.

Exporters of live stock to the Colony have improved their methods of shipment. Stock to-day are being shipped in good sized crates in which animals and birds may be comfortable. This is due to the repeated efforts of the Department and the hearty co-operation of the steamship companies.

One condition which is far too prevalent in the Colony is the non-registration of pure-bred animals, which is not due to the expense of registration, because any pure-bred calf may be registered for ten shillings, a very low price considering the benefit arising from such a record, for at times when we least expect it, some of our pure-bred stock may become of interest to outside buyers, and I would strongly advise intending local purchasers of stock not to pay too high prices for it unless accompanied by registration papers.

The general condition of all live stock in the Colony was more than fair during the year under report, and the improvement towards pure-bred lines is very evident throughout the whole island. This speaks well for the efforts of the Department. The poultry industry advanced in quality during the year, evidence of which was clearly shown at our last Exhibition in April, 1930.

There are certain periods of the year when many animals are being imported that an outbreak of mild, so called, distemper may occur; the mortality in such cases is almost nil, and the period of cessation from work of the animals is very short.

Respectfully submitted,

R. L. TUCKER, D.V.S.,
Government Veterinary Officer.

Flatts, Bermuda,
14th June, 1930.

Report of the Horticulturist, 1929.

Director of Agriculture,

I have the honour to submit my report for the year ending 31st Decembebr, 1929.

Routine Work.

The general routine work of the maintenance of all flower beds, shrubberies, lawns, hedges, driveways and plants under glass was judiciously carried out. On the whole, the grounds were kept in a very satisfactory condition.

Several improvements were made during the year. A slat-house, measuring 60 feet by 25 feet, with a cedar-supported roof, 9 feet high on one side, sloping to 7 feet on the other, was built on the site of the old quarry east of the glass-houses. Seedling plants, which were becoming drawn, were removed from the glass-houses and placed in the new enclosure, much to their advantage. This type of building has many advantages over the glass-house in this equable climate, in that the plants do not become so drawn, grow much more sturdy and are hardier. It is hoped that in the near future another building will be erected in place of one or more of the glass-houses which, owing to their requiring constant repair, are becoming a very expensive proposition.

The encroachment of the root system of the two large Ficus trees growing south of the central lawn necessitated the reconstruction of the flower beds nearby and the returfing of a considerable area of ground. This work was completed, and the beds were planted out with newly introduced shrubs, annuals being used to fill in.

Work was begun on the new vista which will open up a view from the South Road to the central lawn. The Acalypha-hedged enclosure to the north-east of the old Citrus orchard was done away with, a new service enclosure being made to the eastward. A considerable portion of the grading and turfing was completed, also some of the planting. A cross avenue of palms was also planted.

The first portion of the succulent garden was built just north of the slathouse, and was planted. The extension of this work is to be governed by the increase of the stock of suitable plants.

Seed Sowings.

Results of early sowings of annuals were good. Seeds imported experimentally from Australia resulted in good germination, but as yet no report can be given as to the excellence of the varieties sown. All seeds received from stations abroad were sown under glass, germination being fairly good in the majority of cases. Of the thousand odd species of seeds received from abroad for trial, the major portion consisted of trees, shrubs and palms, and the lesser of succulents, herbaceous and bulbous plants. Trees and palms suitable for roadside planting were chiefly considered, but as the germination and growth of these plants is rather slow and varied, no definite results can as yet be reported. Excellent results were obtained with some of the shrubs, a number being planted out. Other seedlings were potted up. The succulent collection was greatly added to by the good results obtained in the germination of seeds, and it is to be hoped that in

the near future much use will be made of this very varied type of plant. Succulents are easily propagated in sand by means of cuttings, and they make excellent subjects for planting in dry localities. Good results were obtained with the bulbous plant seeds, there being very few species which will not thrive in the Colony.

Acknowledgment of Seeds and Plants Received.

Several new additions were welcomed to the seed exchange mailing list, resulting in 1,400 packets of seeds being sent in for trial. In addition to these, plants were also received.

The Horticultural Section is greatly indebted to the Directors and Superintendents of the undermentioned stations for their contributions of plants, seeds and spores.

BRITISH COLONIES.

Departments of Agriculture.

Ottawa, Canada
Giza, Egypt
Kuala Lumpur, Federated Malay States
Hong Kong
St. Helena
Southern Rhodesia
Kampala, Uganda

Botanical Gardens and Other Institutions.

Paradeniya, Ceylon
El Saff, Egypt
Cambridge, England
Hyde Park, London, England
Kew, Surrey, England
John Innes Institute, Merton, England
La Hore, India
Saharanpur, India
Dublin, Irish Free State
Dunedin, New Zealand
Victoria, Nigeria
Edinburgh, Scotland
Glasgow, Scotland
Kirstenbosch, South Africa
Singapore, Straits Settlements
Mrs. Hayward, Galashiels, Scotland.

FOREIGN.

Departments of Agriculture.

Honolulu, Hawaii
Manila, Philippines
Washington, D.C., U.S.A.

Botanical Gardens and Other Institutions.

Graz, Austria
Innesbruck, Austria
Brussels, Belgium
Sofia, Bulgaria
Manchuria, China
Pruhonice, Czechoslovakia
Copenhagen, Denmark
Brignoles, France
Montpellier, France
Berlin, Germany
Amsterdam, Holland
Groningen, Holland
Trieste, Italy
Konosho-Kyoku, Kogawaken, Japan.
Seed Testing Station, Brno, Czechoslovakia
German University, Prag, Czechoslovakia
Carolinae University, Prag, Czechoslovakia
Algiers, North Africa
Warsaw, Poland
Leningrad, Russia
Taschkent, Russia
Upsala, Sweden
Zurich, Switzerland
Montevideo, Uruquay
Brooklyn, N.Y., U.S.A.

Buitenzorg, Java
Zagreb, Jogoslavia
Kaunas, Lithuania
Brno, Czechoslovakia
Cambridge, Mass., U.S.A.
Santa Barbara, Cal., U.S.A.
East Lansing, Mich., U.S.A.
New York, N.Y., U.S.A.

We are also indebted to the undermentioned local subscribers:

His Excellency Lieutenant-General Sir Louis Jean Bols; Vice-Admiral Sir C. Fuller; Lady Wadson, Pembroke; Miss E. Allen, Hamilton Parish; Mr. C. A. Baker, Tucker's Town; Mr. J. J. Bushell, Devonshire; Mr. Freer Cox, Devonshire; Miss Mary Gray, Paget; Wor. J. Scott Pearman, Smiths; Mrs. W. T. Porter, Tucker's Town; Miss H. M. Rees, Pembroke; Miss L. Moncure-Robinson, Paget; Mr. C. F. Rogers, Paget; Mrs. Fitzhugh Simon, Tucker's Town; Mrs. S. Swansen, Pembroke; Mr. R. R. Swainson, St. Georges.

Dispatches of Seeds, Plants, etc.

Seeds and spores were dispatched abroad to the undermentioned.

BRITISH COLONIES.

Departments of Agriculture.

St. Lucia, B.W.I.
Ottawa, Canada
Giza, Egypt
Kuala Lumpur, Federated Malay States
Bathurst, The Gambia
Aburi, Gold Coast
Hong Kong
St. Helena
Seychelles
Tanganyika Territory

Botanical Gardens and Other Institutions.

Melbourne, Australia
Vancouver, Canada
Paradeniya, Ceylon
El Saff, Egypt
Cambridge, England
Kew, Surrey, England
John Innes Institute, Morton, England
Dargeling, India
Saharanpur, India
Dublin, Irish Free State
Victoria, Nigeria
Edinburgh, Scotland
Glasgow, Scotland
Kirstenbosch, South Africa
Singapore, Straits Settlements

FOREIGN.

Departments of Agriculture.

Honolulu, Hawaii
Washington, D.C., U.S.A.

Botanical Gardens and Other Institutions.

Innesbruch, Austria
Brussels, Belgium
Sofia, Bulgaria
Saigon, Cochinchina
Brno, Czechoslovakia
Seed Testing Station, Brno, Czechoslovakia
German University, Prag, Czechoslovakia
Carolinae University, Prag, Czechoslovakia
Palermo, Italy
Pavia, Italy
Rome, Italy
Trieste, Italy
Konosho-Kyoku, Kogawaken, Japan
Zagreb, Jogoslavia
Kaunas, Lithuania
Algiers, Northern Africa
Warsaw, Poland
Leningrad, Russia
Taschkent, Russia
Valencia, Spain

Pruhonice, Czechoslovakia	Groningen, Holland
Upsala, Sweden	Basil, Switzerland
Copenhagen, Denmark	Montevideo, Uruguay
Brignoles, France	Brooklyn, N.Y., U.S.A.
Montpellier, France	Cambridge, Mass., U.S.A.
Berlin, Germany	New York, N.Y., U.S.A.

A total of some 900 packets of seeds and spores was dispatched abroad. Local exchanges and plants sold amounted to approximately 750. Numerous cuttings and packets of seeds were also locally distributed.

The decision of the Board of Agriculture to sell surplus plants and to continue to distribute plants suitable for roadside planting free of charge to the Arbor Societies was not taken advantage of. Communications were received from only two of the Arbor Societies, although a circular letter and a list of the plants available were sent out. This was not due to lack of enthusiasm on the part of the Societies, but to their inability to obtain sufficient funds to do the planting work.

PUBLICATIONS.

A second seed exchange list was published and circulated. It consisted of six mimeographed sheets, containing some 260 plant names arranged under their families.

There were issued a list of plants available at the Station for Arbor Societies and a list of surplus and available plants for sale.

VISITS AND ADDRESSES.

Recorded visits for the year numbered 255. Meetings of the Somerset, Pembroke and Smiths Arbor Societies and the Bermuda Garden Club were attended and addressed.

Collecting trips were made to the Walsingham and Paynter's Vale districts, and to the marshes.

Respectfully submitted,

J. C. NAUEN,
Horticulturist.

21st January, 1930.

Report of the Assistant Inspector of Produce, 1929.

The Director of Agriculture,

I beg to present the following comments and recommendations.

Beets.—Beets with small tops are preferred.

Carrots.—Large loose carrots sold readily throughout the season. Small ones seldom sold over $1.00 per crate, and I would advise farmers not to ship small carrots to the New York market. When the farmer receives his sales he may think that he is receiving as much for his small carrots as the larger ones, as most sales are averaged.

Celery.—Most of our celery is too large, therefore, we cannot get sufficient number of stalks in the crate for the demand of the trade.

I consider it a mistake to ship celery on deck, as the deck celery hurts the sale of the balance of the cargo.

Last years' celery deal undoubtedly depressed prices this year.

Parsley.—Bermuda parsley is much preferred but the market is always oversupplied from Texas and other points.

Potatoes.—Our potatoes this season have been of very small size. Had they been larger there would have been no hard matter in getting a better price. I would suggest that at least fifty per cent of our crop next season be shipped in crates. The crates shipped by the Department of Agriculture this year sold well, and were highly recommended. The buyers of these came back the following week to get more. I would recommend that No. 3 potatoes be no longer shipped to the New York market.

Tomatoes.—The tomatoes shipped to New York were picked too green. These should be on the turn when packed, as the buyers look for tomatoes ready for use. The crates are too small for the New York market.

Crates.—I understand that the Board has decided to have a new style of vegetable crate for next season. This I consider to be a very good change.

The ends of all celery crates should be made with nails long enough to be clinched.

Respectfully submitted,

T. ARTHUR HOLLIS,
Assistant Inspector of Produce.

Shelly Bay, Bermuda,
30th May, 1930.

APPENDIX A

Expenditure (Exclusive of Salaries) for the Year Ended 31st December, 1929.

1. FEES TO MEMBERS OF BOARD.

Appropriated by Act No. 40, 1928.....				£	70	0	0
Paid to members for attendance....	£	64	0	0			
Unexpended balance.....		6	0	0			
	£	70	0	0	£	70	0	0

2. GENERAL GRANT.

Appropriated by Act No. 40, 1928.....				£2,200	0	0
Labour on experimental plots, lawns, flower beds, glasshouses and drives, and care of live stock.....	£1,547	10	3			
Prison labour.....	13	0	0			
Carting and ploughing.....	98	5	0			
Manure and fertilizers.....	30	17	3			
Seed potatoes, seeds, bulbs and plants	121	6	7			
Live stock—feed, bedding and incidentals	186	17	4			
Repair and renewal of buildings, tools, etc.....	72	13	4			
Cleaning offices.....	3	0	2			
Stationery and printing, local.....	75	19	0			
Stationery and printing, foreign....	10	4	9			
Agricltural Clubs, prizes to.....	1	10	0			
Foreign postage.....	32	13	10			
Cables	1	5	1			
Typewriter	26	18	4			
Sundry	6	11	2			
Unexpended balance.....	–	7	11			
	£2,200	0	0	£2,200	0	0

3. INSPECTION SERVICES, MARKET INVESTIGATIONS AND CONTINGENCIES.

Appropriated by Act No. 40, 1928.....				£1,020	0	0
Inspection of vegetables at dock....	£ 238	13	0			
Representation in New York.....	215	10	4			
Survey of Canadian market and inspection of potatoes in Canada and United States by Director.....	220	12	3			
Survey of New York Market by Director	13	8	9			
Expenses of Plant Pathologist in New York inspecting lilies.....	9	12	2			
Inspection of seed potatoes in United States by Dr. S. E. A. McCallan....	3	4	2			
Survey of Canadian market by Assistant Inspector of Produce.....	64	0	9			
Lily bulbs and buds distributed in England	52	6	2			
Lily bulbs distributed in Canada....	–	19	8			
Advertising lily bulbs in England...	29	11	7			
Advertising vegetables in Canada...	10	8	4			
Experimental shipment of vegetables to Canada.....	2	11	0			
Carried forward.....	£ 860	18	2	£1,020	0	0

Brought forward	£	860	18	2	£1,020	0	0
Experimental shipment of potatoes to England		4	9	2			
Experimental shipment of crated potatoes to United States		15	6	4			
Compensation to owners of condemned lily bulbs		21	0	0			
Subscription to marketing periodicals		13	19	5			
Cables		26	10	4			
Cleaning and lighting Farmers' Market		8	12	0			
Purchase of potato grader		9	12	6			
Printing and miscellaneous supplies		60	12	0			
Unexpended balance		–	–	1			
	£	1,020	0	0	£1,020	0	0

4. ERADICATION OF ANIMAL DISEASES.

Appropriated by Act No. 40, 1928					£	75	0	0
Compensation to owners of condemned stock	£	17	0	0			
Supplies and contingencies		55	18	4			
Unexpended balance		2	1	8			
	£	75	0	0	£	75	0	0

5. PURPOSES OF PLANT AND BULB DISEASES AND PEST ACT.

Appropriated by Act No. 40, 1928					£	150	0	0
Labour	£	11	18	9			
Fungicides and insecticides		28	12	7			
Subscription to pathological periodicals		1	19	10			
Material for pathological glasshouse		5	15	4			
Inspection of lilies at Hyde Park, London, by Mr. Lawrence Ogilvie		2	15	6			
Equipment and contingencies		98	18	0			
	£	150	0	0	£	150	0	0

6. IMPROVEMENT OF LIVE STOCK.

Appropriated by Act No. 40, 1928					£	50	0	0
Expenses of Government Veterinary Officer in United States of America, studying certain diseases of cattle	£	31	18	2			
Subscription to live stock periodicals		7	9	3			
Registration of cattle		1	5	3			
Supplies and contingencies		8	1	4			
Unexpended balance		1	6	0			
	£	50	0	0	£	50	0	0

7. ANNUAL AGRICULTURAL EXHIBITION.

Appropriated by Act No. 40, 1928					£	400	0	0
Labour, material and contingencies	£	400	0	0			
Unexpended balance		–	–	–			
	£	400	0	0	£	400	0	0

8. PURCHASE OF BOOKS AND SCIENTIFIC APPARATUS.

Appropriated by Act No. 40, 1928.....					£	25	0 0
Apparatus, books and contingencies.	£	24	2	9			
Unexpended balance.....		–	17	3			
	£	25	0	0	£	25	0 0

9. DEPARTMENTAL CONTINGENCIES, TRAVELLING EXPENSES OF OFFICERS OF DEPARTMENT, TELEPHONES, LIGHTING, ETC.

Appropriated by Act No. 40, 1928.....					£	120	0 0
Carriage hire	£	31	18	0			
Boat transportation		2	2	9			
Telephones		14	7	6			
Electric light and power.....		7	13	1			
Printing, local		37	10	0			
Foreign postage		11	0	0			
Supplies and contingencies.....		15	7	9			
Unexpended balance.....		–	–	11			
	£	120	0	0	£	120	0 0

10. HORTICULTURE.

Appropriated by Act No. 40, 1928.....					£	150	0 0
Tools	£	26	14	11			
Labour		27	16	0			
Plants, seeds and bulbs.....		9	16	2			
Cartage		2	8	0			
Supplies and contingencies.....		35	15	1			
Material for slat-house.....		47	8	2			
Unexpended balance.....		–	–	10			
	£	150	0	0	£	150	0 0

11. RENT ALLOWANCE TO PLANT PATHOLOGIST.

Appropriated by Act No. 40, 1928.....					£	100	0 0
Expended	£	100	0	0			
	£	100	0	0	£	100	0 0

APPENDIX B

Statement of Reimbursements to Government, and Value of Produce Supplied to Other Institutions During the Year Ended 31st December, 1930.

1. REIMBURSEMENTS TO GOVERNMENT.

Sale of vegetables	£	59	14 2
Sale of citrus fruits.....		5	13 0
Sale of plants.....		8	12 1
Sale of seeds.....		5	17 0
Lily certificates.....		32	10 8
Spraying services.....		14	1 3
Registration fees from seedsmen.....		4	0 0
Live Stock fees.....		52	19 0
Hire of potato grader.....		4	0 0
Miscellaneous receipts.....		5	12 11
	£	193	0 1

2. PRODUCE SUPPLIED TO OTHER INSTITUTIONS.

Milk to King Edward VII Memorial Hospital	£105	18	0
Vegetables to King Edward VII Memorial Hospital	24	5	0
Vegetables to other institutions	27	18	9
	£158	1	9

APPENDIX C

RAINFALL, 1929.

January	3.46	inches
February	2.39	"
March	2.78	"
April	3.39	"
May	2.94	"
June	8.60	"
July	4.38	"
August	13.03	"
September	2.98	"
October	6.37	"
November	6.53	"
December	3.77	"
Total	60.62	inches